Forecasting Value in Acquisitions

Gavin Ward, RISC Partner & London Office General Manager
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2018 Analysis using Public Data
Components of Critical factors in Due Diligence

Status ➔ Subsurface Cases* ➔ Valuation Case* ➔ Conclusions

- Good
- Bad
- Ugly

Valuation Methods
- Net Book Value
- EBITDA multiple
- Earnings per share
- Benchmarked $/Boe
- Discounted Cash Flow & WACC

‘Calibration is King’ for continuous improvement
1) Question your assumptions (P90, Mode, P50, Mean, P10)
2) Focus on the BIG assets
3) Flag Black Swan events (as best you can)
4) RANGES are critical (including Low side): Banks and Auditors are Sometimes Right
5) Take care with Contingent/Undeveloped fields

Valuation is not the same as the price paid through negotiation

7 February 2018
A McKinsey survey of almost 90 M&A professionals conducted in mid-2009 showed new interests and attitudes toward mergers.

28 January 2015
According to collated research and a recent Harvard Business Review report, the failure rate for mergers and acquisitions sits between 70% and 90%.

Nearly half of those surveyed believed the deals they manage would “increase in transaction value” over the next three years. ... Even now, this approach produces M&A failure rates of 66% and 75%.

Practicalities of Production Forecasting (using historic production/DCA)

Ravenspurn North Gas Field Life of Field Forecast
(Arthur Andersen, Deloitte, I.H.S)
1996, 2006 and 2016 publications

Gross Production (mmcf/d)

Change of operator
2012

Ref: SPE (The Practicalities Of Optimizing the Bottom Line For Mature Fields)
Portfolio Effect: Volume Prediction (35 wells)

Onshore, Gulf of Mexico, USA

‘Expect’ approximately four to seven 6’s with thirty five rolls of the die

Ref: AAPG 2006 (Basics are Boring – The Essentials of Good Portfolio Management at Independent Oil and Gas Companies)
Portfolio Effect: Cost Analysis of approx. 50 wells

Test assumptions: On budget for portfolio but not individual business units

Key
- Deepwater GOM
- Offshore Shelf GOM
- Onshore USA
- International

Ref: AAPG 2006 (Basics are Boring – The Essentials of Good Portfolio Management at Independent Oil and Gas Companies)
Valuation Case History: Venture Production 2009 Portfolio Reviewed in 2018

**RISC** engaged by Venture Production for CPR

- **Centrica plc paid £1.3 bill**

<table>
<thead>
<tr>
<th>Category</th>
<th>Low Scenario (£ mill)</th>
<th>Base Scenario (£ mill)</th>
<th>Upside Scenario (£ mill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>-</td>
<td>1,742</td>
<td>2,209</td>
</tr>
<tr>
<td>Contingent &amp; Prospective</td>
<td>-</td>
<td>160</td>
<td>225</td>
</tr>
<tr>
<td>Other assets</td>
<td>-</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>-</td>
<td>1,910</td>
<td>2,442</td>
</tr>
</tbody>
</table>

- **20 Producing Fields**
- **26 Discovered Non-Producing**
- **> 50 Prospects & Leads**

2018 Analysis & Look Back using Public Data

FINANCIAL TIMES

**Venture concedes and accepts Centrica bid**

_CASE MAID AUGUST 31, 2019_

Venture Production has grudgingly accepted defeat in its battle to thwart a £3.2bn takeover by Centrica, the UK’s biggest utility.

Venture’s board on Tuesday at last recommended that investors accept Centrica’s 8.4p offer. Even so, the board, which holds 12.3 per cent of the stock, endorsed its belief that the price undervalued the company.

Larry Edghill, one of Venture’s founders, and ActLight Capital Partners, the investment group, together own 22.8 per cent of Venture. For more than a month they had insisted the shares were worth at least £1. But after Centrica had managed to secure more than 50 per cent of Venture’s shares, they told Venture’s board on Tuesday they would accept the bid.
Valuation Process: Forecast Low Scenario in 2009

2018 Analysis & Look Back using Public Data

- 2009: RISC reviewed over 80% of Ventures assets on a 2P reserves basis.
- 2009: Contingent & Prospective resources valued using a unit value method ($/Boe).
- 2009: Effective date = 1 July 2009
- 2009: **No Low scenario**: only Base & Upside requested*

**Re-Creating Low side case production volume from Normalised type curves based on Base and Upside scenarios**

<table>
<thead>
<tr>
<th>Venture</th>
<th>Low Volume Scenario (£ mill)</th>
<th>Base Scenario (£ mill)</th>
<th>Upside Scenario (£ mill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>1,280</td>
<td>1,742</td>
<td>2,209</td>
</tr>
<tr>
<td>Contingent &amp; Prospective</td>
<td>95</td>
<td>160</td>
<td>225</td>
</tr>
<tr>
<td>Other assets</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,383</strong></td>
<td><strong>1,910</strong></td>
<td><strong>2,442</strong></td>
</tr>
</tbody>
</table>

2009 Forecast Low Case Valuation (P90) = Volume & Price

2009 Forecast Lowest Case Valuation (P99) = Volume & Price & Cost

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(Ref: Production data from OGA & Netherlands [https://www.nlog.nl/en/data](https://www.nlog.nl/en/data))
Forecasts 2009 v Actuals 2018: Production
2018 Analysis & Look Back using Public Data

Total Portfolio - Calculated from Individual Field Profiles

- **Upside (2009)**
- **Base (2009)**
- **Lowside #1 (2018)**
- **Lowside #2 (2018)**
- **Lowside #3 (2018)**
- **Actual**
- **Actual Cygnus Start Up Shuffled to Planned Start Up**

**DESCRIPTION**
- Lowside #1: Lognormal distribution - Modelled from Base & Upside
- Lowside #2: Lognormal distribution - Modelled from Base & Upside
- Lowside #3: Normal distribution - Modelled from Base & Upside

**End of RISC model**

**Cygnus Field Forecast Production (Bcfe)**

First Gas = 15 Dec 2016
2016 = 0.75 Bcfe, 2017 = 38.99 Bcfe

(Ref: Production data from OGA & Netherlands [https://www.nlog.nl/en/data](https://www.nlog.nl/en/data))

*Low scenario production volume from Normalised type curves based on Base and Upside cases*
Valuation Case History: Price Prediction

**Brent Oil Price**

- Historic Brent Oil ($/Bbl)
- Valuation forward Base Price Model

**Actual v Forecast Gas Price**

- Month Beginning Actual UK Gas Spot Price (p/therm)
- Valuation forward Base Price Model

**Reserves Portfolio**

(218 MMBoe)

- Oil
- NGL
- Gas

51.2
23.5%

161.2
74.0%

5.5
2.5%
Variance: £1.3 Billion Acquisition 2009 (CPR Base Valuation = £ 1.9 Bill)

<table>
<thead>
<tr>
<th></th>
<th>Base Forecast in 2009</th>
<th>Actual 2009 - 2018</th>
<th>Variance 2009 - 2018</th>
<th>%Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cygnus Delay</td>
<td>£1,910 mill</td>
<td>£1,750 mill</td>
<td>(£-160) mill</td>
<td>-8.4%</td>
</tr>
<tr>
<td>Oil Price</td>
<td>£1,910 mill</td>
<td>£2,023 mill</td>
<td>£113 mill</td>
<td>5.9%</td>
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<tr>
<td>Gas Price Change</td>
<td>£1,910 mill</td>
<td>£1,526 mill</td>
<td>(£-384) mill</td>
<td>-20.2%</td>
</tr>
<tr>
<td>Actual Cygnus Rates</td>
<td>£1,910 mill</td>
<td>£1,966 mill</td>
<td>£56 mill</td>
<td>2.9%</td>
</tr>
<tr>
<td>Actual Production*</td>
<td>£1,910 mill</td>
<td>£1,664 mill</td>
<td>(£-246) mill</td>
<td>-12.9%</td>
</tr>
</tbody>
</table>

**Re-Forecast from 2018**

1) Chestnut
2) Mallard
3) Goosander
4) Grouse
5) Gadwell
6) Eris
7) Saturn
8) Cygnus (14 Bcf increase)

Remaining fields too small
e.g.: Ensign, Chiswick

*Undeveloped Contingent Resources: Acorn, Carna, Christian & Selkirk fields*
Bridge the Gap: £1.3 Billion Acquisition & CPR Base Valuation = £ 1.9 Bill

Gain/Loss in Value (2009 – 2018)

- **2018 Review in 2019: Add Back Value**
  - Did not review actual costs — data not publicly available
  - Did not model tax changes
    - Change in Small Fields Allowance (2010, 2012)
    - Shallow Water Allowance (2012)
    - Supplementary Charge (2011, 2016)
    - Decommissioning Relief (2017)
  - Did not model Cygnus Base increase from 560 Bcf to 635* Bcf (13%)

* Gross field Proven + Probable: Offshore Technology online
Conclusions: ‘Calibration is King’ for continuous improvement

1. Question your assumptions (e.g.: New owner/acquirer uses same investment plan)

2. Focus on the **BIG** assets (they skew the portfolio effect)

3. Consider/Flag Black Swan* events (5 year delay?)

4. RANGES are critical (including Low side): Banks and Auditors are Sometimes Right

5. Treat Contingent/to be developed fields with extra care (not all convert to Reserves)

6. **MODE = ‘Most Likely’**

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*Black Swan event = metaphor describing an event that is a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of hindsight: (Cygnus field?)
Thanks to Adam Borushek (RISC, London office) & Simon Barber (RISC, Perth office)